

## AMENDMENT TO CLAIMS

Claim 1 (Currently amended) An isolated polypeptide comprising an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4 to SEQ ID NO:6, SEQ ID NO:8 to SEQ ID NO:22, and a fragment of any of the previous amino acid sequences wherein said fragment has the biological activity of the polypeptide encoded by SEQ ID NO:2.:

~~(i) an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4 to SEQ ID NO:6, and SEQ ID NO:8 to SEQ ID NO:22;~~

~~(ii) an amino acid sequence which is at least 60% homologous to an amino acid sequence from (i);~~

~~(iii) an amino acid sequence which is at least 80% identical to an amino acid sequence from (i); or~~

~~(iv) a fragment of any of (i) to (iii) with a biological activity of the polypeptide encoded by SEQ ID NO:2.~~

Claim 2 (Currently amended) An isolated polynucleotide comprising a polynucleotide selected from the group consisting of a polynucleotide encoding the polypeptide of Claim 1 and a polynucleotide having the sequence of SEQ ID NO: 1.:

~~a nucleotide sequence encoding a polypeptide according to claim 1;~~

~~the nucleotide sequence set out in SEQ ID NO:1;~~

~~a nucleotide sequence corresponding to a degenerate version of the sequences defined in (i) or (ii);~~

~~a nucleotide sequence capable of selectively hybridising to the sequences in (i) to (iii);~~

~~a nucleotide sequence complementary to any of the sequences (i) to (iv).~~

~~a fragment of the sequence in (v) suitable for use as a primer or probe.~~

Claims 3-5 (Cancelled)

Claim 6 (Currently amended) A vector comprising a nucleotide polynucleotide sequence according to claim 2.

Claim 7 (Original) A host cell transformed or transfected with the vector according to claim 6.

Claim 8 (Original) An antibody specific for an amino acid sequence according to claim 1.

Claim 9 (Original) An antibody according to claim 8 further comprising a detectable label.

Claim 10 (Cancelled).

Claim 11 (Currently amended) A method of screening a sample for *Brachyspira* species, including but not limited to *B. hyodysenteriae*, *B. intermedia*, *B. alvinipulli*, *B. aalborgi* and *B. pilosicoli* comprising the steps of:

- (i) contact the sample with a polynucleotide according to claim 2 [(vi)] under suitable hybridising conditions; and
- (ii) detecting any duplexes formed between the polynucleotide and nucleotide sequences in the sample.

Claim 12 (Cancelled).

Claim 13 (Original) A method of screening a sample for a polypeptide according to claim 1 comprising:

- (i) contacting the sample with an antibody according to claim 8 under conditions which allow for the formation of a reaction complex; and
- (ii) detecting the reaction complex.

Claim 14 (Original) A method of screening a sample for an antibody according to claim 8 comprising the steps:

- (i) contacting the sample with a polypeptide according to claim 1 under conditions which allow for the formation of a reaction complex; and
- (ii) detecting said reaction complex.

Claim 15 (Currently amended) A kit for screening a sample for *Brachyspira* species, including but not limited to *B. hyodysenteriae*, *B. intermedia*, *B. alvinipulli*, *B. aalborgi* and *B. pilosicoli* comprising:

- (i) a polynucleotide according to claim 2 [(vi)]; and
- (ii) [(means)] a label for detecting any duplexes formed between the polynucleotide and nucleotide sequences in the sample.

Claim 16 (Currently amended) A kit for screening a sample for a polypeptide according to claim 1 comprising:

(i) an antibody according to claim 8;

(ii) ~~[[means]]~~ a label for detecting a reaction complex comprising the antibody.

Claim 17 (Currently amended) A kit for screening a sample for an antibody according to claim 8 comprising:

(i) a polypeptide according to claim 1; and

(ii) ~~[[means]]~~ a label for detecting a reaction complex comprising the polypeptide.

Claim 18 (Currently amended) A method of treating a disease associated with *Brachyspira* species, including but not limited to *B. hyodysenteriae*, *B. intermedia*, *B. alvinipulli*, *B. aalborgi* and *B. pilosicoli* in an animal comprising administering to the animal an effective amount of a composition selected from the group consisting of:

(i) a composition comprising a polynucleotide sequence according to claim 2 ~~(i) to (iv)~~ in a form adapted to result in the expression of the polypeptide encoded by the polynucleotide;

(ii) a polypeptide according to claim 1; or

(iii) the composition of (i) or the polypeptide of (ii) together with an adjuvant.

Claim 19 (Cancelled)

Claim 20 (Currently amended) ~~[[A]]~~ The method of treating a disease according to claim 18 ~~[[or 19]]~~ wherein the disease is intestinal spirochaetosis.

Claim 21 (Currently amended) A method of immunising an animal against a disease associated with *Brachyspira* species, including but not limited to *B. hyodysenteriae*, *B. intermedia*, *B. alvinipulli*, *B. aalborgi* and *B. pilosicoli* comprising the step of administering an immunogenic amount of a composition selected from the group consisting of:

(i) a composition comprising a polynucleotide sequence according to claim 2 ~~(i) to (iv)~~ in a form adapted to result in the expression of the polypeptide encoded by the polynucleotide;

(ii) a polypeptide according to claim 1; or

(iii) the composition of (i) or the polypeptide of (ii) together with an adjuvant.

Claim 22 (Currently amended) [[A]] The method according to claim 21 wherein the disease is intestinal spirochaetosis.

Claim 23 (Currently amended) [[A]] The method according to ~~any one of claims 18 to 22~~ claim 18 wherein the animal is selected from the group consisting of: pigs, chickens, dogs, horses, cattle, sheep, fish, and humans.

Claim 24 (Currently amended) A composition comprising a carrier and an immunogen wherein said immunogen is selected from the group consisting of a polypeptide according to claim 1, a polynucleotide according to claim 2, and an antibody according to claim 8. and: (i) a polypeptide according to claim 1; (ii) a polynucleotide according to claim 2; or (iii) an antibody according to claim 8.

Claim 25-26 (Cancel)

Claim 27 (New) An isolated polypeptide comprising an amino acid sequence that is at least 90% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4 to SEQ ID NO: 6, and SEQ ID NO: 8 to SEQ ID NO: 22 wherein the polypeptide can, when injected into an animal, cause the animal to generate an immune response to *Brachyspira* species.

Claim 28 (New) The isolated polypeptide of Claim 27 wherein said amino acid sequence is at least 80% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4 to SEQ ID NO: 6, and SEQ ID NO: 8 to SEQ ID NO: 22, wherein the polypeptide can, when injected into an animal, cause the animal to generate an immune response to *Brachyspira* species.

Claim 29 (New) The isolated polypeptide of Claim 27 wherein said amino acid sequence is at least 70% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4 to SEQ ID NO: 6, and SEQ ID NO: 8 to SEQ ID NO: 22, wherein the polypeptide can, when injected into an animal, cause the animal to generate an immune response to *Brachyspira* species.

Claim 30 (New) The isolated polypeptide of Claim 27 wherein said amino acid sequence is at least 60% homologous to an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 4 to SEQ ID NO: 6, and SEQ ID NO: 8 to SEQ ID NO: 22, wherein the

polypeptide can, when injected into an animal, cause the animal to generate an immune response to *Brachyspira* species.